INTRAOCULAR LENS INSERTING TOOL

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a divisional application of prior application Ser. No. 736,908 filed on Oct. 29, 1976 and now U.S. Pat. No. 4,124,905.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to artificial intraocular lens systems employed in opthalmology for the correction of aphakia; and more particularly this invention relates to the lens support system for positioning and affixing the lens in the eye after a natural lens extraction. The invention further relates to a mechanical tool employed in inserting the lens system into the eye.

2. Description of the Prior Art

Presently, there are three distinct methods employed in the art of correcting aphakia resulting from a cataract extraction. In accordance with one practice, the aphakic patient is fitted with a powerful spectacle lens, which lens provides the correction required to restore useful vision to the aphakic eye. The opthalmic lenses designed to correct an aphakic condition are highly undesirable because they are extremely thick, heavy, and tend to distort the wearer's appearance. The patient suffers from cosmetic discomfort, restricted peripheral vision, distortion of peripheral images, poor binocular vision, scotoma, and reduced ability to clearly focus.

According to the second practice, the patient is fitted with a contact lens. The contact lens overcomes many of the disadvantages associated with spectacles. However, because cataracts are usually a problem associated with the elderly who have lost much of their dexterity, such contact lenses are not desirable.

The third practice developed in the late 1940's when Harold Ridley inserted the first artificial intraocular lens into a human eye. Believing that the artificial lens belongs "where nature intended the crystalline to be", he inserted the artificial lens in the posterior chamber of the eye. The posterior chamber is that area between the iris and the vitreous humor where the natural lens is located i.e., rearwardly the iris.

In the early 1950's, and as a result of medical complications which often occurred after a postpupillary insertion, lenses were developed for insertion in the anterior chamber of the eye. The anterior chamber being that area normally occupied by aqueous humor and being between the iris and the cornea i.e., forwardly of the iris.

Throughout the evolution of the art of correcting aphakia, the shape of the artificial intraocular lens has remained substantially unchanged. The art has primarily concentrated on developing and improving ways for affixing the lens within the interior of the eye. To date, there have developed several methods of lens fixation such as posterior chamber fixation, anterior chamber fixation, iris fixation, iridocapsular fixation, and capsular fixation. Typically fixation means are disclosed in U.S. Pat. No. 3,922,728 of Krasnov, U.S. Pat. No. 3,913,148 of Potthast, U.S. Pat. No. 3,906,551 of Otter, U.S. Pat. No. 3,866,249 of Flom, U.S. Pat. No. 3,711,870 of Deitrick, and U.S. Pat. No. 3,673,616 of Fedorov, et al.

Typically, the artificial intraocular lenses of the prior art are biconvex, planoconvex or concavoconvex in shape and have a power range of about +8 to +25 diopters as measured in the aqueous. As compared with the natural lens of the human eye, the artificial lenses are relatively heavy.

Artificial lenses of the prior art have a number of disadvantages. The typical iris clip lens rely on the constrictor muscles of the iris as the positioning means. The iris is therefore maintained in the state of tension, is prevented from assuming a normal shape and the clips obstruct full and normal constriction. Often the operating physician sutures the iris to clips or holes drilled into the lens so as to secure and properly position the lens. The suture materials normally employed are known to disintegrate and dissolve over a period of time. As the suture material disappears positive fixation of the lens can be lost. In place of sutures some lenses require flexible wires which are caused to penetrate through the iris and engage a loop or other engaging means. The surgical steps are difficult especially for a relatively inexperienced physician; and the positioning and placement of these flexible wires require that the physician make an incision in the iris.

SUMMARY OF THE INVENTION

In accordance with the present invention there is provided an artificial intraocular lens system which is extremely simple to implant. The implantation does not require either suturing of the lens to the iris or incisions of the iris. The lens system upon implantation is positively fixed to the iris. The lens does not interfere with the normal constriction or the dilation of the iris. There are no small diameter metal wires which will place a strain upon the iris. The density of the lens can be made to approach the density of the liquid in which the lens is surrounded after implantation thereby reducing harmful affects associated with the movement of the lens due to inertial effects.

The lens system of this invention comprises an optical zone and means for supporting the lens in the eye. The lens may be supported in the anterior chamber, posterior chamber or iris plane of the eye. The improvement of this lens over the prior art comprises at least one pair of anterior and posterior tabs which extend from the periphery or circumferential edge of the optical zone. The tabs are oppositely disposed and spaced apart a distance sufficient to receive a portion of the iris therebetween withoutsubstantially interfering with the constriction and dilation of the iris. The anterior tab includes an opening adapted to receive and allow the passage of a pin therethrough. The anterior tab and the posterior tab cooperate to hold the pin substantially perpendicular therebetween whereby the pin having penetrated through the iris obtains a lens positively fixed in the eye.

Preferably one end of the pin is anchored into the lens so that during the surgical implantation, the pin cannot be lost. The support system further includes additional anterior and posterior haptics such as haptic rims, loops, rods and/or tabs as supporting means for the lens.

The invention further includes a medical tool or device for insertion of the lens into the eye. The tool comprises generally first, second and third relatively movable members. The first and second members are adapted to grip the anterior tab portion of the lens system. The third member is adapted to engage a pivotable pin provided on said lens system to move said pin relative to said tab.